DOCUMENT RESUME

ED 206 224 HE 014 242

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TITLE The Computer as a Research and Teaching Instrument for Students in the Behavioral Sciences.
SPONS AGENCY National Science Foundation, Washington, D.C.
PUB DATE [81]
GRANT NSF-SER-7900394
NOTE 7p.
AVAILABLE FROM U.S.: Illinois

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Behavioral Sciences; College Students; Computer Oriented Programs; *Computer Science Education; *Curriculum Development; Faculty Development; Higher Education; Interdisciplinary Approach; *Psychology; Research Methodology; *Sociology; *Statistical Analysis; Undergraduate Study
IDENTIFIERS Computer Literacy; *Millikin University IL

ABSTRACT

A program designed to provide students a background in computers and computing that was implemented by the Department of Behavioral Sciences at Millikin University, Illinois, is described. The program was implemented in three overlapping stages: faculty preparation; course preparation; and course implementation. The development of faculty expertise in computing was accomplished through self-training (particularly the learning of statistical packages, etc.), conference attendance, and coursework. Computer training was incorporated into courses already existing within the behavioral science curriculum. Computer labs were introduced in methodology courses in psychology and sociology, and computer-based assignments were used in a number of sociology courses. Additionally, a new psychology course entitled "Computer Applications in the Behavioral Sciences" was established. While students undertook statistics and research methodology coursework, they were introduced to procedures for carrying out data analysis using SPSS (Statistical Package for the Social Sciences) and SAS (Statistical Analysis System). Introductory sociology students were briefly introduced to research methods; provided with a description of NORC's General Social Survey (GSS) data base; introduced to the use of SPSS with a written manual; and assigned simple SPSS exercises involving variables contained in the GSS. More advanced sociology student coursework also used computer-based assignments. The new computer applications course will include such topics as: data processing with statistical packages, writing programs for data analysis using an Apple II microcomputer, and program writing to facilitate experimental procedures. (SW)

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The Computer as a Research and Teaching Instrument for Students in the Behavioral Sciences[1]

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[1]This project was funded by NSF Grant #SER-7900394

I. Philosophy and Program Objectives

In response to the changing emphasis within the field of Behavioral Sciences, our department recently initiated a program to develop basic research skills in our students. As part of this project students were to be given background in computers and computing skills. We felt that the computer was becoming increasingly important as a research and teaching instrument in the fields of psychology and sociology, and that, as a result, our students should have at least some exposure to this technology.

The specific objectives of the program were:

(1) to familiarize students with the fundamentals of computer science, as well as to help them understand the uses and limitations of the computer with respect to the behavioral sciences.

(2) to encourage students to view the computer as a tool that could facilitate research and scientific methods. Perhaps most importantly, we wanted to help students overcome "computerphobia," a condition which we encountered quite frequently in our non-technologically oriented students.

(3) to guide students in the actual use of the computer. Students would learn to prepare data, write and run programs, and interpret computer printouts.

(4) to prepare students for jobs and graduate study in which computing skills may be valuable or desirable.

II. The Program Design

Our program was implemented in three overlapping stages: faculty preparation; course preparation; and course implementation. The first phase of the program was concerned with the development of faculty exper-

tise in computing. Much of this was accomplished through self-training (particularly the learning of statistical packages, etc.). Several faculty attended conferences in order to get ideas on what other behavioral scientists were doing with computers in their courses; one faculty member enrolled in a course on BASIC. We found the National Conference for On-Line Computing in Psychology to be helpful in providing us with some direction.

The second phase of the program entailed course preparation. We had decided that the teaching of computing skills would be accomplished best by incorporating computer training into courses already existing within the behavioral science curriculum. We spent time planning which courses were to be affected, how much time should be allotted to computer training in those courses, and how the information and training on computers could best be integrated with substantive material related to sociology and psychology. We actually compiled a self-teaching manual that was designed to be used in those courses where computer training was expected to be most intense.

The third phase of the program was course implementation. Since this phase represented the real aim of the project, it is discussed in more detail in the paragraphs below.

III. Course Implementation

Computer training for behavioral science students was effected through three avenues: (1) introduction of computer labs in our methodology courses in psychology and sociology; (2) use of computer-based assignments in a number of sociology courses; and (3) establishment of a new course in psychology entitled "Computer Applications in the Behavioral Sciences."

Methodology Courses. A two-semester sequence on statistics and research methodology is required of all psychology and sociology majors and

minors. These courses deal with such topics as experimental design. survey construction and research. and data analysis. Accordingly, the focus of computer training in these courses has been on data processing. About one lab period every two weeks has been devoted to instruction on computers (components of the computer, computer jargon, etc.); then, as the course reached the point of discussing statistics, students were given step-by-step procedures for carrying out data analysis using SPSS (Statistical Package for the Social Sciences) and SAS (Statistical Analysis System). Thus, rather than having students use a calculator for computing various statistics, they were provided with the appropriate SPSS statements (explanations of these statements were provided in the manual that was written) necessary for analyzing the data on the computer. To make certain that students understood how and when to use the various SPSS statements, they were required to run five to eight of these programs during the semester. By the end of the semester, students had learned to prepare data for computer analysis, to enter the data using a CRT terminal, to assemble and run statistical programs, and to interpret the printout.

Substantive Sociology Courses: Computer based assignments are now being used in the introductory sociology course. Students are given a brief introduction to research methods; provided with a description of NORC's General Social Survey (GSS) data base; introduced to the use of SPSS with the written manual; and assigned simple SPSS exercises involving variables contained in the GSS. Each student is required to complete an individual assignment, but preliminary practice is obtained by means of group projects. The GSS data base is also being used in the Criminology and Family classes, where students are given empirical observations contained

within their reading assignments and asked to execute simple SPSS "Frequencies" or "Crosstabs" procedures to determine if the relationships presented in the text are also present in the GSS data. Both confirmations and discrepancies are then used to initiate class discussion. In the junior-senior level classes (e.g., Urban Sociology, Social Change, etc.) students are encouraged to conduct small scale empirical research projects and analyze the results using SPSS. This semester approximately half of the students in these two classes are engaged in such projects. Finally, senior students are encouraged to explore independent research topics in some depth and in the past two years, six seniors have used SPSS to analyze the data they have collected.

Establishment of a New Course. Beginning next fall, we will offer on a trial basis, a course entitled "Computer Applications in the Behavioral Sciences." Although the course is still in the planning stages, it is expected that the course will provide psychology and sociology majors with a variety of experiences in computing. These experiences are intended to demonstrate the versatile uses of the computer in addressing and solving behavioral science problems. The course will include such topics as: sophisticated types of data processing with statistical packages, the writing of programs for data analysis using an Apple II microcomputer, and the writing of programs that can be used to facilitate experimental procedures. In this last category, students would write programs in BASIC for such purposes as random generation of nonsense syllables for human learning experiments, stimulus presentation for perception studies, control of operant conditioning in the animal lab, etc. We believe that a course of this type would give students a feel for the ways in which computers can be put to work for the behavioral scientist.

IV. Impact

It appears that the program has had major positive effects on both students and faculty. As might have been expected, the initial reaction of students was apprehension, followed by curiosity and fascination (the "new toy" stage), and finally, an appreciation for how the computer could serve some of the needs of the behavioral scientist. End-of-semester evaluations have indicated that most students were "turned on" to computers--more than half expressed the desire for more expanded training in the future, and several students enrolled in computer courses in other departments to learn more about computing.

While it is too early to assess the long-term impact of the program, we can make the assumption that computing skills are an asset to those students pursuing graduate study in the social sciences. Furthermore, in three instances, former students have indicated that their computing skills were an important consideration in obtaining employment.

Faculty as well have been affected by the program. There is no doubt that the faculty who are involved in the program have acquired computing knowledge and skills that they otherwise would not have obtained.